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Point Beach Nuclear Plant
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Two Rivers, WI 54241

NMC
Committed to Nuclear Excellence

NRC 2002-0092

October 15, 2002

10 CFR 50.73

Document Control Desk
U. S. NUCLEAR REGULATORY COMMISSION
Mail Station P1-137
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Ladies/Gentlemen:

Docket Number 50-266
Point Beach Nuclear Plant, Unit 1
Licensee Event Report 266/2002-001-00
Steam Generator Blowdown Valve Analyzed As Not Able To Close Against Full Differential Pressure

Enclosed is Licensee Event Report (LER) 266/2002-001-00 for the Point Beach Nuclear Plant, Unit 1. This LER discusses the discovery that under the new AOV program, one steam generator blowdown isolation valve would not have shut at full steam generator differential pressure. Subsequently, an adjustment to the spring closing force of the valve was made which brought the valve within acceptance of the calculation. The subject condition was determined to be reportable under 10 CFR 50.73(a)(2)(ix)(A) as an unanalyzed condition that had the potential to significantly degrade plant safety.

Completed corrective actions have been identified in the attached report. No new commitments were identified in this LER.

If you have any questions concerning the information provided in this report, please contact Lisa A. Schofield at (920) 755-6043.

Sincerely,

Tom Taylor
Plant Manager

Enclosure

NRC Regional Administrator
NRC Resident Inspector

NRC Project Manager
PSCW

IE22

NRC FORM 366 (7-2001)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)		Estimated burden per response to comply with this mandatory information collection request. 50 hours Reported lessons learned are incorporated into the licensing process and fed back to industry Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U S Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503 If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection

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TITLE (4)
STEAM GENERATOR BLOWDOWN VALVE ANALYZED AS NOT ABLE TO CLOSE AGAINST FULL DIFFERENTIAL PRESSURE

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER 05000
08	16	2002	2002	- 001	- 00	10	15	2002	FACILITY NAME	DOCKET NUMBER 05000

		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR : (Check all that apply) (11)						
OPERATING MODE (9)	1		20.2201(b)		20 2203(a)(3)(ii)	X	50 73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
POWER LEVEL (10)	100		20 2201(d)		20 2203(a)(4)		50 73(a)(2)(iii)	50.73(a)(2)(x)
			20 2203(a)(1)		50 36(c)(1)(i)(A)		50 73(a)(2)(iv)(A)	73.71(a)(4)
			20 2203(a)(2)(i)		50 36(c)(1)(ii)(A)		50 73(a)(2)(v)(A)	73.71(a)(5)
			20 2203(a)(2)(ii)		50 36(c)(2)		50 73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
			20 2203(a)(2)(iii)		50 46(a)(3)(ii)		50 73(a)(2)(v)(C)	
			20 2203(a)(2)(iv)		50 73(a)(2)(i)(A)		50 73(a)(2)(v)(D)	
			20 2203(a)(2)(v)		50 73(a)(2)(i)(B)		50 73(a)(2)(vii)	
			20 2203(a)(2)(vi)		50 73(a)(2)(i)(C)		50 73(a)(2)(viii)(A)	
			20 2203(a)(3)(i)		50 73(a)(2)(ii)(A)		50 73(a)(2)(viii)(B)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Lisa Schofield, Licensing Engineer	(920) 755-6043

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	SB	V	C635	Y					

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).		NO				

ABSTRACT (Limit to 1400 spaces, i e , approximately 15 single-spaced typewritten lines) (16)

On August 16, 2002, during the development of the new AOV evaluation and assessment program at Point Beach Nuclear Plant (PBNP), NMC Engineers determined that 1MS-5959, one of two steam generator (SG) blowdown isolation valves on Unit 1, may have been unable to shut with full differential pressure of 1085 psig across the valve.

The new AOV evaluation and assessment program is used to determine whether the valve's performance will meet design basis functions under prescribed operating conditions. In this case, we evaluated that 1MS-5959 would not have shut under those conditions. Since this is a new evaluation method, it was not used when the valve was diagnostically tested in 1999.

This condition was documented in the PBNP corrective action program as CAP029065. Interim action was taken to place the valve in the required shut position to ensure that minimum feed water flow requirements would be maintained in the event of a loss of normal feed water accident. Following diagnostic testing, adjustment of the spring closing force of this AOV, and successful completion of post maintenance testing, 1MS-5959 was restored to full operability, and Unit 1 "B" SG blowdown was restored. The remaining Unit 1 and 2 SG blowdown isolation valves at PBNP were evaluated and determined to be capable of shutting against the maximum differential pressure assumed within the calculation.

This event is reportable as an unanalyzed condition that had the potential to significantly degrade plant safety. The safety assessment concluded that the overall safety significance of this event was low.

Event Description:

Engineering personnel from the Nuclear Management Company (NMC), the licensee for the Point Beach Nuclear Plant (PBNP), have been working together with vendor personnel to develop improved methods for assessing the performance of risk significant and active function air operated valves (AOV) [V] The changes we have incorporated into this improved AOV assessment program include using the guidelines of EPRI TR-107322, "AOV Evaluation Guide," for evaluating AOV performance, and the use of more conservative estimates of possible valve parameter degradations in the calculations. The AOV assessment activities include performance of diagnostic testing of AOVs to obtain operating characteristics and measurement of valve performance. These parameters are then compared to calculated values to assure that the AOV performance will meet the design basis functions under the prescribed operating conditions. Among the valves currently being evaluated in this program are the steam generator (SG) [SG] blowdown isolation valves [ISV]

On August 16, 2002, NMC engineers through analysis and testing determined that the Unit 1 "B" SG blowdown isolation valve, 1MS-5959, may have been unable to close with full differential pressure of 1085 psig across the valve. There are four SG blowdown isolation valves at PBNP (i.e., one valve per steam generator and two steam generators per unit).

The blowdown isolation valves are required to isolate to support two functions: 1) containment isolation, and 2) steam generator pressure boundary isolation. This containment penetration meets class 4 containment isolation criteria (FSAR page 5.2-3), which is a normally operating line connected to a closed system inside of containment, provided with at least one manual valve located outside of containment and missile protected throughout its length. FSAR Figure 5.2-50-1 lists manual valve 1MS-266 as a containment isolation valve, but also lists 1MS-5959 as an isolation valve inside of containment. Although 1MS-5959 may not be able to close at full SG pressure, it would be able to close at the maximum containment design pressure (60 psig), which may occur if a SG is faulted. Since the requirement for a class 4 penetration is still met by using 1MS-266, and 1MS-5959 would still function under the conditions of a faulted SG, the containment isolation function of 1MS-5959 is considered to be operable.

The NMC initial evaluation identified that a seismic event could present a challenge to the SG pressure boundary isolation function of this valve. A seismic event is assumed to cause a Loss of Normal Feedwater (LONF), initiation of auxiliary feedwater (AFW) [BA], failure of the SG blowdown line downstream of valve 1MS-5959, and rupture of the condensate storage tanks, the normal AFW water supply. The worst case malfunction or single failure is the loss of bus D-01. This would disable the low pressure suction trip mechanism for the Unit 1 turbine-driven AFW pump (1P29) [P] and one of the two electric-driven AFW pumps (P-38A). This unlikely, but nonetheless possible, sequence of events would leave only the P-38B motor driven AFW pump available. However, with the Unit 1 "B" steam generator blowdown isolation valve unable to close and perform its SG isolation function, an undetermined portion of the AFW flow to that SG could be diverted out the faulted blowdown pipe.

The function to establish the SG pressure boundary is based on the requirements of the Chapter 14 accident analyses for the LONF (FSAR Section 14.1.10) and the Loss of All AC Power to the Station Auxiliaries (LOAC, FSAR Section 14.1.11). The accident analyses credit 200 gpm AFW flow delivered to the SGs after a five-minute delay. The acceptance criteria for both accidents are that the pressurizer does not overfill. Overfilling of the pressurizer could result in a small break LOCA due to the assumed failure of a pressurizer safety valve or PORV when passing liquid. If the SG blowdown valve cannot perform its SG isolation function, the minimum AFW flow credited in the accident analyses may not be met. Valve 1MS-5959 may also be required to establish integrity following a Steam Generator Tube Rupture (SGTR), and the valve may not have been able to close under those conditions.

This potential for the 1MS-5959 blowdown isolation valve to fail to close under design conditions was determined to be reportable pursuant to 10 CFR 50 72(B)(3)(ii)(B) as: "Any event or condition that results in: (B) The nuclear power plant being in an unanalyzed condition that significantly degrades plant safety." The NRC was called with an event notification (EN# 39135) concerning this condition at 2048 EDT on August 16, 2002.

Cause:

Valve 1MS-5959 was evaluated as unable to shut against all expected operating pressure conditions. The evaluation was based on a vendor calculation not previously used for this valve. This condition was discovered during the ongoing development of the new AOV evaluation and assessment program at PBNP. We are in the process of evaluating all risk significant, active function AOVs under this program. The new AOV evaluation and assessment program is used to determine whether the valves performance will meet design basis functions under prescribed operating conditions. In this case, we evaluated that the valve would not have shut under those conditions. Because this is a new evaluation method, it was not available for use when the valve was diagnostically tested in 1999. We have evaluated this situation under the provisions of the Maintenance Rule and concluded that this failure was not considered Maintenance preventable.

Corrective Actions:

This condition was documented in the PBNP corrective action program (CAP029065). Station log entries indicate that 1MS-5959 was shut at 1230 CDT on August 16, 2002. This action placed the valve in the position needed to ensure that minimum feed water flow requirements would be maintained in the event of a loss of normal feed water accident 1MS-5959 was declared out of service as a SG pressure boundary at 1415 CDT on August 16, 2002.

In order to perform additional diagnostic testing and set up of 1MS-5959, the upstream steam generator blowdown line manual isolation valve, 1MS-218, was closed. Following diagnostic testing, adjustment of the spring closing force of 1MS-5959, and successful completion of post maintenance testing, 1MS-5959 was restored to full operability at 1925 CDT on August 16, 2002. The manual isolation valve was reopened and Unit 1 "B" SG blowdown restored.

The remaining three SG blowdown isolation valves at PBNP were evaluated and determined to be capable of shutting against the maximum differential pressure assumed within the calculation.

Component and System Description:

<u>Steam Generator Blowdown</u>

Each of the two PBNP steam generators per unit is provided with two 2½-inch bottom blowdown connections for shell-side solids concentration control. The two connections are at the same level, but on opposite sides of the shell. Piping from the two connections join to form a 2-inch blowdown header for each steam generator. The bottom of each steam generator is also provided with a drain connection which discharges into the blowdown line.

Each blowdown line is provided with a hand shutoff valve and an air operated trip valve. Each blowdown line includes, in addition to these shutoff valves, a manually-operated needle-type flow control valve for blowdown flow adjustment. A steam generator sample line, also provided with a trip valve, is taken from the blowdown line inside containment. A slipstream from each sample line is monitored for radiation. In the event of a high radiation signal, the trip valves in the sample and blowdown lines, and a trip valve in the blowdown tank drain line will close.

Downstream of the blowdown line trip valves, the blowdown from each steam generator can be aligned to pass through the blowdown heat exchangers. Each heat exchanger is composed of two shell and tube heat exchangers connected in series. The blowdown passes through the tube side of the heat exchangers and is cooled by water from the main condensate system. The blowdown then passes to the blowdown tank. It is also possible to align the blowdown from each steam generator directly to the blowdown tank, or to both the blowdown tank and the blowdown heat exchangers.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Safety Assessment:

As discussed in the Event Description, we conservatively concluded that following a postulated seismic event and assuming a specific single failure, the capability to remove decay heat following a unit shutdown would be diminished due to the inability of the Unit 1 "B" SG blowdown isolation valve to close at full steam generator differential pressure. This is an unanalyzed condition. We subsequently calculated that the isolation valve would ultimately shut at approximately 800 psid. This would terminate the diversion of the AFW flow out the blowdown pipe. The continued addition of AFW flow to the SG would then provide adequate decay heat removal. Although we have not specifically evaluated the potential consequences of the diversion of a portion of the AFW flow to the "B" SG until the isolation valve shut, we have determined that this scenario is not risk significant. Our initial assessment is that the combination of events and failures necessary to result in this unanalyzed condition has low safety significance. Additionally, the probability of the seismic event causing piping failure downstream of the 1MS-5959 valve coincident with a core damaging steam generator tube rupture is very low. Accordingly, the impact on the health and safety of the public and plant staff due to this postulated event was low.

We have also determined that under the actual conditions identified in this event description, there is a reasonable expectation that the safety function to remove decay heat was not compromised and remained available via the unaffected "A" SG. Accordingly, this event did not involve a safety significant functional failure

Similar Occurrences:

A review of recent LERs (past two years) identified the following events, which involved an unanalyzed condition that had the potential to significantly degrade plant safety.

LER NUMBER	Title
301/2002-002-00	Pressurizer Safety Valve Failed to Lift at Test Pressure
266/2001-003-01	Containment Response for MSLB May Exceed Design Pressure